

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) An apparatus comprising:

a first processor to execute a main thread instruction stream that includes a delinquent instruction, wherein the first processor is to be associated with a first private cache;

a second processor to execute a helper thread instruction stream that includes a subset of the main thread instruction stream in response to execution of a trigger instruction from the main thread, wherein the subset includes the delinquent instruction, and wherein the second processor is to be associated with a second private cache;

a shared memory system coupled to said first processor and to said second processor; and
control logic to push , responsive to a miss of requested data for the delinquent instruction in the second private cache associated with the second processor, the requested data to the first private cache associated with the first processor.

2. (Previously Amended) The apparatus of claim 1, wherein: the first processor, second processor and logic are included within a chip package, and wherein the shared memory system includes a shared cache.

3. (Previously Amended) The apparatus of claim 1, further comprising retrieval logic coupled to the control logic to retrieve the requested data from the shared memory system in response to the miss of the requested data for the delinquent instruction in the second private cache.
4. (Currently Amended) The apparatus of claim 3, wherein: the control logic to push, responsive to a miss of requested data for the delinquent instruction in the second private cache, the requested data to the first private data cache of the first processor comprises ~~the control logic, responsive to the miss of the requested data and the retrieval logic retrieving the requested data, to broadcasting~~ the requested data to an affinity group of processors including at least the first processor.
5. (Currently Amended) The apparatus of claim 3, wherein: the control logic to push, responsive to a miss of requested data for the delinquent instruction in the second private cache, the requested data to the first private data cache of the first processor comprises ~~the control logic, responsive to the miss of the requested data and the retrieval logic retrieving the requested data, to unicasting~~ the requested data to the first processor.
6. (Previously Amended) The apparatus of claim 1, wherein: the control logic is further to provide the requested data from the shared memory system to the second private data cache associated with the second processor.

7. (Currently Amended) A processor comprising:
- a first processor core to be associated with a first private cache and to execute a first thread;
- a second processor core to be associated with a second private cache and to execute a second speculative thread, the second speculative thread to include a load instruction from the first thread that a miss to the first private cache is anticipated during execution of the first thread, wherein the first processor core is further to trigger the second processor core's execution of the second speculative thread responsive to execution of a trigger instruction in the first thread with the first processor core; and
- logic to retrieve data for the load instruction from a higher level memory and to provide the data to the first private cache associated with the first processor core in response to a miss to the second private cache responsive to execution of the load instruction in the second speculative thread with the second processor core.
8. (Previously Amended) The processor of claim 7, wherein: the logic to retrieve data for the load instruction from a higher level memory and to provide the data to the first private cache comprises in response to a miss to the second private cache

responsive to execution of the load instruction in the second speculative thread with the second processor core comprises the logic to

retrieve the data in response to the miss to the second private cache

responsive to execution of the load instruction in the second speculative thread with the second processor, and

broadcast the data to private caches associated with an affinity group of processor cores, the affinity group of processor cores including at least the first processor core.

9. (Previously Amended) The processor of claim 7, wherein: the logic to retrieve data for the load instruction from a higher level memory and to provide the data to the first private cache comprises in response to a miss to the second private cache responsive to execution of the load instruction in the second speculative thread with the second processor core comprises the logic to
- retrieve the data in response to the miss to the second private cache
- responsive to execution of the load instruction in the second
- speculative thread with the second processor, and
- unicast the data to the first private cache associated with the first private
- core.
10. (Currently Amended) The processor of claim 7, wherein: the higher-level memory includes a memory coupled external to the processor, ~~and wherein the first processor core is further to trigger the second processor core's execution of the second speculative thread responsive to execution of a trigger instruction in the first thread with the first processor core.~~

11. (Currently Amended) An apparatus comprising:
- a first processor to execute a main thread instruction stream that includes a delinquent load instruction, wherein the first processor is to be associated with a first data cache;
 - a second processor to execute a helper thread instruction stream that includes a subset of the main thread instruction stream, wherein the subset includes the delinquent load instruction, and wherein the second processor is to be associated with a second data cache, and wherein the first processor is further to trigger the second processor's execution of the helper thread instruction stream responsive to a trigger instruction in the main thread instruction stream;
 - retrieval logic to retrieve, responsive to a miss of requested data for the delinquent load instruction in the second data cache, the requested data; and
 - control logic to provide the requested data to the first data cache associated with the first processor in response to the retrieval logic retrieving the requested data and without a request from the first processor.

12. (Previously Amended) The apparatus of claim 11, further comprising: a third processor and a shared memory system coupled to said first processor, said second processor, and said third processor.
13. (Previously Amended) The apparatus of claim 12, wherein: retrieval logic to retrieve, responsive to a miss of requested data for the delinquent load instruction in the second data cache, the requested data comprises:

the retrieval logic, responsive to the miss of requested data for the delinquent load instruction in the second data cache, to issue a snoop for the requested data to a third data cache associated with the third processor, and

the third data cache to provide the requested data to the retrieval logic in response to receiving the snoop issued from the retrieval logic.

14. (original) The apparatus of claim 13, wherein: the retrieval logic to retrieve, responsive to a miss of requested data for the delinquent load instruction in the second data cache, the requested data further comprises:
- the retrieval logic, responsive to the miss of requested data for the delinquent load instruction in the second data cache, to request the requested data from the shared memory system concurrently with issuing the snoop to the third data cache; and
- the retrieval logic to receive the requested data from the shared memory system in response to a miss of the requested data in the third data cache.
15. (Previously Amended) The apparatus of claim 12, wherein: the first, second, and third processors each include a processor core on a single package, and wherein the shared memory system includes a shared higher-level cache.

16. (Cancelled)

17. (Cancelled)

18. (Currently Amended) A method comprising:

executing a main thread including a load instruction and a trigger instruction with a first core, the first core associated with a first private cache;

executing a helper thread with a second core in response to executing the trigger instruction with the first core;

missing a second private cache associated with the ~~a~~-second core in response to executing the load instruction within the ~~a~~-helper thread with the second core ; and

prefetching load data for the load instruction into the first private cache responsive to missing the second private cache in response to executing the load instruction within the helper thread with the second core.

19. (Previously Amended) The method of claim 18, wherein prefetching the load data

for the load instruction into the first private cache further comprises:

retrieving the load data from a shared memory system; and

broadcasting the load data to an affinity group of cores including at least the first core in response to retrieving the load data from the shared memory system.

.

20. (Previously Amended) The method of claim 18, further comprising:

providing the load data for the load instruction from a shared memory system into the second private cache associated with the second core.

21. (Previously Amended) The method of claim 18, further comprising:
providing the load data for the load instruction from a shared memory system into a private cache for each of a plurality of helper cores including the second core.
22. (Previously Amended) The method of claim 18, wherein prefetching the load data for the load instruction into the first private cache further comprises:
retrieving the load data from a third private cache associated with a third core; and
providing the load data to the private cache associated with the first core in response to retrieving the load data from a third private cache.
23. (Previously Amended) The method of claim 18, wherein prefetching the load data for the load instruction into the first private cache further comprises:
concurrently:
broadcasting a request for the load data to each of a plurality of cores; and
requesting the load data from a shared memory system.

24. (Previously Amended) The method of claim 23, wherein prefetching the load data for the load instruction into the first private cache further comprises:

providing, if the load data is available in a private cache of one of the plurality of cores, the load data to the main core from the private cache of one of the plurality of cores ; and

providing, if the load data is not available in a private cache of one of the plurality of cores, the load data to the main core from the shared memory system.

25. (Currently Amended) An article comprising:

a machine-readable storage medium having a plurality of machine accessible instructions, which if executed by a machine, cause the machine to perform operations comprising:

determining that a helper core has suffered a miss in a helper private cache for a load instruction from a main thread executing on a main core while executing a helper thread, wherein the helper thread is to be spawned on the helper core in response to the main core executing a trigger instruction from the main thread; and

fetching load data for the load instruction in response to determining the helper core has suffered the miss in the helper private cache for the load instruction; and

pushing, unsolicited from the main core, the load data into a main private cache of the main core in response to fetching the load data for the load instruction.

26. (Previously Amended) The article of claim 25, wherein: fetching load data for the load instruction in response to determining the helper core has suffered the miss in the helper private cache for the load instruction comprises: retrieving the load data from a shared memory system in response to determining the helper core has suffered the miss in the helper private cache for the load instruction; and wherein pushing, unsolicited from the main core, the load data into a main private cache of the main core in response to fetching the load data for the load instruction comprises: broadcasting the load data to an affinity group of private caches of an affinity group of cores including the main private cache of the main core.

27. (Previously Amended) The article of claim 25, : fetching load data for the load instruction in response to determining the helper core has suffered the miss in the helper private cache for the load instruction comprises: retrieving the load data from a shared memory system in response to determining the helper core has suffered the miss in the helper private cache for the load instruction; and wherein pushing, unsolicited from the main core, the load data into a main private cache of the main core in response to fetching the load data for the load instruction comprises: unicasting the load data to the main private cache of the main core.
28. (Previously Amended) The article of claim 25, further comprising: a plurality of machine accessible instructions, which if executed by a machine, cause the machine to perform operations comprising: providing load data for the load instruction from a shared memory system into the private cache for each of a plurality of helper cores including the helper private cache of the helper core.

29. (Previously Amended) The article of claim 25, wherein: fetching load data for the load instruction in response to determining the helper core has suffered the miss in the helper private cache for the load instruction comprises: retrieving the load data from an additional helper private cache of an additional helper core.

30. (Cancelled):

31. (Cancelled)

32. (Currently Amended) A system comprising:

a memory system ;

a first processor, coupled to the memory system, to execute a first instruction stream;

a second processor, coupled to the memory system, to concurrently execute a second instruction stream in response to the first processor executing a trigger instruction from the first instruction stream to spawn the second instruction stream; and

helper threading logic to push fill data to a first private cache of the first processor, the fill data to be prefetched by the second processor and to be pushed to the first private cache before a request for the fill data is issued by the first processor.

33. (Cancelled)
34. (Previously Amended) The system of claim 32, wherein: the helper threading logic is further to push the fill data to the first private cache of the first processor from a second private cache of the second processor.
35. (Previously Amended) The system of claim 32, wherein: the helper threading logic is further to push the fill data to the first private cache of the first processor from the memory system.
36. (Previously Amended) The system of claim 32, wherein the first processor and the second processor are each processor cores, and wherein the first processor core, the second processor core, and the helper threading logic are included in a single processor package coupled to the memory system. .
37. (Previously Amended) The system of claim 36, wherein: the memory system includes a cache that is shared by the first and second processor cores coupled to a dynamic random access memory.